New paper sheds light on bacterial cell wall recycling

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A new paper by a team of researchers led by Shahriar Mobashery, Navari Family Professor of Life Sciences at the University of Notre Dame, provides important new insights into the process by which bacteria recycle their cell wall.

The cell wall is a critically important entity for bacteria and essential for their survival. It is a rigid entity encasing the bacterium, and antibiotics are designed to interfere with disease processes by affecting its maturation. The function of antibiotics is to impair the cell wall, leading to bacterial death.

Scientists have determined that during bacterial growth a substantial amount of the parental cell wall is recycled. Although the recycling process has been known, its intricacies have not been well understood to date.

Mobashery's team synthesized pieces of the cell wall of the bacterium Escherichia coli in his laboratory and was able to use the synthetic wall components to observe the chemical reactions that take place during the recycling process.

The researchers found that a member of the lytic transglycosylases family of enzymes known as M1tB performed the requisite cell wall fragmentation on the synthetic sample of the cell wall from their laboratory. They also were able to measure the rate of the transformation by M1tB, determining that 14,000 pieces of the cell wall are processed by each molecule of M1tB in one bacterial generation.

The product of the M1tB reaction on the cell wall is the entity that initiates the recycling event, but when it diffuses out of the bacterium, it causes the onset of the pro-inflammatory events associated with bacterial infections.

The cell wall recycling study appears in the September issue of the *Journal of the American Chemical Society*.

Source: University of Notre Dame